

### **REMARKS**

Claims 1, 7-9, 14, 16-17, 20-22, 25-26, 29, 31, and 36-37 have been amended. Support for the amendments can be found throughout the specification, for example, at Figure 1, Paragraphs [0005], [0012], [0014]-[0015], [0031], [0033]-[0034], and [0036]. Claims 2 and 35 have been cancelled. Claim 38 is new. Support for the new claim can be found, for example, in Figure 1 and at Paragraph [0012] and in claims 7 and 21 as originally filed.

In the Office action mailed on August 16, 2007, claim 16 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,791,689 issued to Weckström ("Weckström"). Claims 1, 3-8, 10-11, 13-15, 17-31, and 34-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Weckström in view of U.S. Patent Application Publication No. US2003/0025909 to Hallstadius ("Hallstadius"). Claims 9, 12, 32, and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Weckström as applied to claim 1, in view of an Examiner Official Notice. The Office action also notes that Applicants' arguments, presented in the June 12, 2007 response were deemed persuasive.

Applicants respectfully submit the present Amendment and Response, in which claims 1, 7-9, 14, 16-17, 20-22, 25-26, 29, 31, and 36-37 have been amended to further clarify the claimed subject matter. Applicants respectfully submit that no new matter has been introduced by the present Amendment and Response.

In view of the amendments to the claims together with the following remarks, Applicants respectfully request reconsideration and withdrawal of all grounds of rejection.

**35 U.S.C. § 102(e) Rejection of Claim 16**

Claim 16 stands rejected under 35 U.S.C. § 102(e) as anticipated by Weckström. For the rejection under § 102(e) to be proper, a reference taken as a whole in its entirety must teach every claim limitation.

Applicants respectfully submit that Weckström fails to teach or suggest at least the following elements of Applicants' claim 16:

“an ozonated water generator”;

“a contactor for mixing water and ozone gas”;

“a pipeline...for delivery of ozonated water to a semiconductor process tool, the pipeline including a plurality of reflection sites”; and

“first and second bands of light diffusely scattered at the plurality of reflection sites in the pipeline.”

Therefore, Applicants respectfully submit that claim 16 is allowable.

The Office action states:

Weckström teaches [] an ozonated water generator, comprising a contactor (23/30) for mixing water and ozone gas, a pipeline in fluid communication with the contactor (23/30) for delivery of ozonated water to a process tool, a light source (1) configured to direct a first band of light and a second band of light along a substantially shared path through the fluid pipeline, the first (8a) and second (8b) bands of light diffusely (i.e. spread or reflected widely or thinly) scattered in the pipeline (figs 2 and 3), wherein ozone in the ozonated water has a greater absorption associated with the first band of light than the second band of light...

Office action at 2-3.

Weckström fails to teach or suggest at least an “ozonated water generator.” Weckström relates to a “sensing apparatus and method for use in the optical absorption analysis of the NO<sub>2</sub> content of a *gas sample*.” See Weckström at abstract (emphasis added). The Office action does

not identify which element of Weckström is the “ozonated water generator.” Applicants respectfully submit that in the system of Weckström, water vapor is undesirable, suggesting that the gas sample is not measured in a liquid environment and that water is not present. For example, Weckström states, “[a] sample chamber [2] is needed especially if the sample gas is to be measured at a higher temperature than ambient or temperature stabilization is applied. The benefit of a higher measuring temperature is not only to prevent condensation of water on the windows 3 but to get more signal.” *Id.* at 4:65-5:3. Weckström thus fails to teach or suggest an element to provide water, let alone an ozonated water generator.

Moreover, Weckström fails to teach or suggest at least a “contactor for mixing water and ozone gas” as recited in claim 16. The Office action identifies reference numerals 23 and 30 of Weckström as indicative of the “contactor for mixing water and ozone gas.” Weckström refers to reference numeral 23 as a “reaction chamber 23.” *Id.* at 7:7. The “reaction chamber 23” is part of “a sensor 21 for nitric oxide” that is “[d]ownstream and after the nitrogen dioxide sensor assembly 29” of Figure 4. *Id.* at 6:66-7:1. The sensor 21 includes “ozone generator 24” for supplying ozone gas to a chamber 26, and “[t]he ozone supplied to the chamber 26 reacts with possible nitric oxide in the sampled gas to form nitrogen dioxide in an excited state.” *Id.* at 7:5-13. Reference numeral 30 of Weckström refers to the “gas mixer 30” shown in Figure 5, which combines nitric oxide gas with ozone or oxygen gas. *Id.* 7:44-51. In the system of Weckström, neither reaction chamber 23 nor gas mixer 30 mix *water* and ozone gas to form ozonated water. Therefore, Applicants respectfully submit that neither reaction chamber 23 nor gas mixer 30 of Weckström constitute a “contactor for mixing water and ozone gas” as recited by Applicants’ claim 16.

Weckström further fails to teach or suggest at least “a pipeline...for delivery of ozonated water to a semiconductor process tool” as recited in Applicants’ claim 16. Weckström states that “the ozone component contaminates and dilutes the [gas] sample,” which requires “scrubber 27...to remove ozone and other toxic gases before they are pumped out to the outlet 28 of the system.” *Id.* at 7:16-20. The “scrubber 27” removes ozone in the embodiments of Weckström shown in Figures 4 and 5. Moreover, the use of ozone in Weckström is limited to reactions with nitric oxide to assist in the detection of nitrogen dioxide in a gas sample (either after the sample has been analyzed as in Figure 4 or before the sample is analyzed in Figure 5). In the system of Weckström, the “scrubber 27” removes ozone prior to delivery of nitrogen dioxide to the output of the system. As shown in Figures 4 and 5, neither the sample gas flowing through the sample chamber 2 nor the ozone gas are delivered to a semiconductor process tool as recited by Applicants’ claim 16. Instead, the sample gas flowing through chamber 2 and the ozone gas are pumped out of the system of Weckström and not delivered to any process tools. *See* Figures 4 and 5, 6:52-65, 7:16-20. Thus, Weckström fails to teach or suggest “a pipeline...for delivery of ozonated water to a semiconductor process tool” as recited by Applicants’ claim 16.

Weckström fails to teach or suggest at least “a pipeline...including a plurality of reflection sites” and “first and second bands of light diffusely scattered at the plurality of reflection sites in the pipeline” recited in Applicants’ claim 16. The Office action inferentially identifies the “pipeline” recited in claim 16 in Figures 2 and 3 of Weckström. *See* Office action at 3, line 1. The Office action suggests the chamber 2 of Weckström is the “pipeline” of Applicants’ claim 16. As explained in Weckström:

[t]he gas to be measured is normally confined to a sample chamber 2 which is typically a long tube with two end windows 3a and 3b, reflecting

inner walls 4 and gas inlet 5a and outlet 5b. The length of this chamber could be about 100 mm for rapid measurements of a sampled gas.

Weckström at 4:54-58.

The radiation from an LED 1...is quite well collimated. Part of the radiation, 8a goes straight through the sample chamber [2] and the rest, 8b, is reflected off the inner wall 4. The radiation is, in other words, efficiently transmitted through the sample chamber to a detector 9...the radiation transfer would be even simpler using a laser diode because of its beam coherence and the subsequent possibility to collimate the beam very accurately.

*Id.* at 5:27-35.

Figures 2 and 3 depict “radiation 8a” and “radiation 8b.” “Radiation 8b” is depicted as once-reflected off of inner wall 4, but Weckström is silent as to any physical effect occurring as a result of the single reflection. *See* Figures 2 and 3 of Weckström. Applicants believe the characterization in Weckström’ of radiation “efficiently transmitted” through the sample gas refers to a minimized loss of intensity of “radiation 8b.”

In contrast, in an ozonated water generator according to Applicants’ claim 16, the pipeline includes multiple reflection sites. The multiple reflection sites result in diffuse scattering of the first and second bands of light along the substantially shared path. Multiple reflection sites have the effect of lengthening the path length over which both the first and second bands of light travel relative to the longitudinal length of the pipeline (*e.g.*, the distance through the sample gas “radiation 8a” travels in Weckström).

As a result, in a system according to Applicants’ claims, the plurality of reflection sites preserves the path length along over which the first and second bands of light travel while shortening the longitudinal length of the pipeline or vessel. *See* Figure 1 of Applicants’ disclosure. For example, in the system of Weckström, to achieve a 100 mm path length,

chamber 2 must be 100 mm long. *See* Weckström at 5:27-35. However, using multiple reflection sites as recited by Applicants' claims, a path length of 100 mm can be achieved using a vessel less than 100 mm in longitudinal length. The system of Weckström, which requires the radiation to be efficiently transmitted through the sample to minimize intensity loss, does not teach or suggest multiple reflection sites nor a reason to have multiple reflection sites in the pipeline as recited by Applicants' claim 16. Therefore, Applicants respectfully submit that Weckström fails to teach or suggest at least this element of Applicants' claim 16.

For the reasons set forth above, Applicants respectfully submit that Weckström fails to teach or suggest every element of Applicants' claim 16, and Applicants' claim 16 is therefore allowable.

**35 U.S.C. § 103(a) Rejection of Claims 1, 3-8, 10-11, 13-15, 17-31, and 34-37**

Claims 1, 3-8, 10-11, 13-15, 17-31, and 34-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Weckström in view of Hallstadius. For the rejection under 35 U.S.C. § 103(a) to be proper, the references, either alone or in combination, must teach or suggest all of the claim limitations.

Claim 35 has been canceled, so the rejection with respect to that claim is now moot. As to the remaining pending claims, Applicants respectfully submit that neither Weckström nor Hallstadius, either alone or in combination, teach or suggest every element as claimed in the claims as amended. Neither Weckström nor Hallstadius, either alone or in combination, teach or suggest, at least, "a plurality of reflection sites," which facilitate first and second bands of light being diffusely scattered as recited variously by Applicants' independent claims 1, 17, 26, and 37 as amended. For at least this reason, Applicants respectfully submit that independent claims 1, 17, 26, and 37 are allowable.

As discussed above, Weckström fails to teach or suggest at least a plurality of reflection sites for diffusely scattering the first and second bands of light as recited by Applicants' claims 1, 17, 26, and 37. Hallstadius fails to cure the defects of Weckström, and neither Hallstadius nor Weckström taken as a whole, either alone or in combination, teach or suggest every element of Applicants' independent claims.

Hallstadius relates to a method and apparatus for measuring the concentration of a substance in a fluid medium, particularly for packaging food products applications. *See* Abstract of Hallstadius. The system of Hallstadius involves directing a beam of light straight through a medium along a path (L). *See* Figure 1 of Hallstadius. Hallstadius states that "[t]he monitoring path (L) has a first end at which the light source is positioned and a second end, on the opposite side of the monitoring space or the measurement cell from the light source, at which means for detecting the light transmitted through the sample medium is positioned. *Id.* at ¶ [0072]. Hallstadius is silent as to a plurality of reflection sites within a vessel for diffusely scattering the first and second bands of light. *Id.* at Figures 1 & 2, ¶¶ [0011], [0076]. In fact, Hallstadius does not teach reflecting light within the medium at all. Any reflection of light discussed in Hallstadius occurs after the light has left the medium.

Therefore, neither Weckström nor Hallstadius, either alone or in combination, teach or suggest every element of Applicants' independent claims, and Applicants' claims should be allowable for that reason. Moreover, Applicants respectfully submit that one of skill in the art would not think to combine Weckström with Hallstadius to diffusely scatter first and second bands of light at a plurality of reflection sites, particularly since Weckström involves minimizing scattering in a relatively long chamber, and Hallstadius is silent as to any scattering while the light traverses a medium.

Thus, neither Weckström nor Hallstadius teach or suggest a system for diffusely scattering light at a plurality of reflection sites, as recited by Applicants' claims.

For the above-mentioned reasons, Applicants respectfully submit that independent claims 1, 17, 26, and 37 are allowable. Claims 3-8, 10-11, 13-15, 17-31, 34, and 36 depend, directly or indirectly, from claims 1, 17, and 26, and thus, Applicants submit that these claims also recited patentable subject matter.

**35 U.S.C. § 103(a) Rejection of Claims 9, 12, 32, and 33**

Claims 9, 12, 32, and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Weckström in view of Official Notice taken by the Examiner. Claims 9, 12, 32, and 33 all depend, directly or indirectly, from amended claim 1, and Applicants' respectfully submit that claims 9, 12, 32, and 33 are allowable for at least the same reasons as described above regarding claim 1. Moreover, Applicants believe that claims 9, 12, 32, and 33 independently recite patentable subject matter.

Applicants appreciate the Examiner identifying how Applicants can seasonably challenge allegedly well-known statements or the Examiner's personal knowledge. Applicants hereby respectfully request the Examiner provide evidence supporting those elements of claims 9, 12, 32, and 33 alleged to be well-known and/or based on the Examiner's personal knowledge, so Applicants can respond to the Official Notice and/or rejection with specificity. Moreover, if this ground of rejection is repeated, Applicants respectfully request the Examiner articulate why one of skill in the art would combine such evidence with the system of Weckström, which, as discussed above, relates to analyzing a gas sample for nitrogen dioxide content, does not use ozone or ozonated water for semiconductor process tools, and fails to teach or suggest a plurality of reflection sites for diffusely scattering first and second bands of light.



**New Claim**

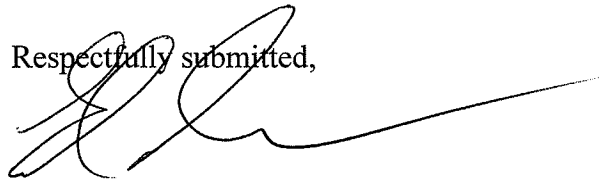
Claim 38 is new. Claim 38 depends from claim 37, and Applicants respectfully submit that claim 38 recites patentable subject for at least the same reasons as described above regarding claim 37.

**CONCLUSION**

Applicants respectfully submit that all pending claims are in condition for allowance and request entry of the above claim amendments and withdrawal of the pending rejections. If the Examiner believes a telephonic interview would expedite the prosecution of the present application, the Examiner is welcome to contact Applicants' Attorney at the number below.

The Commissioner is hereby authorized to charge any fee occasioned by the entry of this paper to Attorney's Deposit Account No. 50-3081.

Respectfully submitted,



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